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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,931	05/10/2002	Luc Varin	14187.00001	8743

27160 7590 10/06/2004

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EXAMINER	
BAUM, STUART F	

ART UNIT	PAPER NUMBER
1638	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/019,931	VARIN ET AL.	
	Examiner	Art Unit	
	Stuart F. Baum	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) *3,10,19-42,45,46 and 48-51* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-9,11-18,43,44 and 47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/10/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *seq. search results*.

DETAILED ACTION

1. Claims 1-51 are pending.

2. Applicant's election with traverse of Group IV, claims 1-2, 4-9, 11-18, 43-44 and 47 including SEQ ID NO:1 in the reply filed on 7/28/2004 is acknowledged. The traversal is on the ground(s) that the presently claimed invention is novel and constitutes an advance over Krajincic et al. Applicants contend that the claims are linked by the discovery that hydroxylated derivatives of jasmonic acid modulate flowering (page 11, last paragraph). Applicants contend that the special technical feature, i.e., modulation of flowering time via hydroxylated derivatives of jasmonic acid, link the claims and that unity of invention does exist (page 12, 2nd paragraph). In addition, Applicants contend that the MPEP 1850(A) specifies that if the independent claims avoid the prior art and satisfy the unity of invention requirement, then the dependent claims shall be grouped with the claim(s) from which it depends (page 12, 2nd paragraph).

This is not found persuasive because the originally filed claims were drawn to a method for modulating flowering in a plant comprising modifying in said plant the endogenous level of jasmonic acid conjugates and other compounds listed in originally filed claim 1 that includes by-products of jasmonic acid. Krajincic et al teach modulating flowering of Spirodela using jasmonic acid. It is inherent that the levels of a jasmonic acid conjugate or any one of the listed compounds in claim 1 would be modified when jasmonic acid is administered to plants. The MPEP, Annex B, Unity of Invention, Part 1 (cii) states that if an independent claim does not avoid the prior art, the question whether there is still an inventive link between all the claims dependent on that claim needs to be carefully considered. In the present application, claims dependent on claim 1 cover more than one method. Applicants are either increasing or

decreasing the level of a compound listed in claim 1. Given that the prior art teaches the technical feature of modulating jasmonic acid compounds, and given that the dependent claims each require distinct method steps, there is not unity of invention between the specified dependent claims.

Applicants contend that the MPEP 803.04 indicates that normally up to ten sequences constitute a reasonable number for examination purposes (paragraph bridging pages 12 and 13).

In regards to the permissible number of sequences as specified in the MPEP, those guidelines were for EST sequences which are much shorter than the nucleic acid sequences presented in the present application, and because of the vast number of sequences now present in the current databases that must be searched, the office does not have the resources to search more than one corresponding pair of nucleic acid and amino acid sequences per application. And lastly, according to the MPEP, up to ten sequences will be examined, and one sequence is considered up to ten, for the reasons stated above.

Applicants request that at least Groups IV, V, X and XI be rejoined because all of these groups relate to modulating flowering in a plant by regulating endogenous levels of hydroxylated derivatives of jasmoic acid and Applicants further request that both SEQ ID NO:1 and 2 be considered together.

The Office contends that Groups IV, V, X and XI are distinct and do not share a special technical feature. SEQ ID NO:1 and 2 are distinct because the respective nucleotide sequences are only 78% identical (see enclosed interference sequence search result), the nucleic acid sequence encoding AtST2a used as a probe did not hybridize with AtST2b mRNA (Figure 11 and page 31, Example 5) and the AtST2a and AtST2b polypeptides are only 85% identical (page

18, lines 4 and 5). Applicants have not disclosed that AtST2a and AtST2b polypeptides have the same function, can be used interchangeably in Applicants' invention and a search of one polypeptide will cover the search for the other polypeptide.

The requirement is still deemed proper and is therefore made FINAL.

Claims 3, 10, 19-42, 45-46 and 48-51 are withdrawn from consideration for being drawn to non-elected inventions.

3. Claims 1-2, 4-9, 11-18, 43-44 and 47 including SEQ ID NO:1 are examined in the present office action.

Oath/Declaration

4. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

Non-initialed and/or non-dated alterations have been made to the oath or declaration. See 37 CFR 1.52(c). On page 2 of the Oath/Declaration, Applicants have amended the zip code.

On page 3 of the Oath/Declaration, the filing date for application 10/019931 is incorrectly listed as July 6, 2000 instead of May 10, 2002.

Information Disclosure Statement

5. The JP 02-092220 document listed on form 1449 has not been considered as it was not provided by the Applicant. As stated in the MPEP § 1.98 (a) Any information disclosure

statement filed under § 1.97 shall include: (1) A list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) A legible copy of:

(i) Each foreign patent;

(ii) Each publication or that portion which caused it to be listed;

Claim Objections

6. Claims 6, 14 and 44 are objected to for reading on non-elected inventions. Correction is requested.

Specification

7. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See for example page 17, line 17 and page 18, line 3. See MPEP § 608.01.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 6-8 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejection includes dependent claims.

Claims 6 and 14 are indefinite in the recitation "AtST2a". The sole designation of a nucleic acid sequence that encodes a polypeptide by "AtST2a" is arbitrary and creates ambiguity

in the claims. For example, the amino acid sequence in this application could be designated by some other arbitrary means, or the assignment of said name could be arbitrarily changed to designate a different nucleic acid sequence encoding a polypeptide. If either event occurs, one's ability to determine the metes and bounds of the claim would be impaired. See *In re Hammack*, 427 F .2d 1378, 1382; 166 USPQ 204, 208 (CCPA 1970). Amendment of the claim to refer to a specific SEQ ID NO would obviate this rejection.

Written Description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-2, 4-9, 11-18, 43-44 and 47 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are drawn to a method for modulating flowering in a plant comprising modifying in said plant the endogenous level of at least one compound listed in claim 1, or wherein flowering is induced by increasing at least one of the compounds listed in claim 1, or wherein the increase in at least one compound is increased by lowering the endogenous level of a sulfotransferase sulfonating 12-hydroxyjasmonic acid and/or 11-hydroxyjasmonic acid, or wherein said lowering is the result of a genetic modification, or wherein the genetic modification includes inhibiting expression of AtST2a and functional homologues thereof, or wherein said

genetic modification includes an antisense nucleic acid sequence, a genetically modified plant in which the level of any of the compounds listed in claim 12 is increased, or wherein said plant has an increased level of a hydroxylase and/or a reduced level of a sulfotransferase, or wherein said level of a sulfotransferase is lowered by expressing any nucleic acid sequence encoding a sulfotransferase, or portion thereof, in antisense orientation, or a method for producing a plant capable of flowering early comprising introducing into a cell an exogenous nucleic acid molecule comprising a nucleotide sequence encoding a plant hydroxyjasmonic acid sulfotransferase in antisense orientation, or wherein said sulfotransferase is a 11- or a 12-hydroxyjasmonic acid sulfotransferase or wherein said nucleotide sequence exhibits 50% sequence identity with SEQ ID NO:1.

The office interprets the word "similarity" in claim 44, line 5, to mean sequence identity, because "similarity" is generally reserved for amino acid comparisons and not nucleotide comparisons. The Office interprets Applicants' claims 1-2, 4-6, and 11-14 to be drawn to methods for modulating flowering comprising transforming a plant with any nucleic acid sequence and claims 15, 43 and 47 to be drawn to any nucleic acid sequence encoding any sulfotransferase and claim 44 to be drawn to any nucleic acid sequence having at least 50% sequence identity to SEQ ID NO:1.

The Federal Circuit has recently clarified the application of the written description requirement to inventions in the field of biotechnology. See University of California v. Eli Lilly and Co., 119 F.3d 1559, 1568, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). In summary, the court stated that a written description of an invention requires a precise definition, one that defines the structural features of the chemical genus that distinguishes it from other chemical structures. A

definition by function does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. The court goes on to say, "A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus." *See University of California v. Eli Lilly and Co.*, 119 F.3d 1559; 43 USPQ2d 1398, 1406 (Fed. Cir. 1997).

Applicants disclose a nucleic acid sequence encoding an Arabidopsis 12-hydroxyjasmonic acid sulfotransferase (AtST2a) of SEQ ID NO:1 (page 5, line 13-17 and pate 6, lines 29-32). Applicants disclose SEQ ID NO:1 that encodes an Arabidopsis sulfotransferase, but Applicants do not identify essential regions of the protein encoded by SEQ ID NO:1, nor do Applicants describe any other polynucleotide sequence that functions to modify flowering and modify the levels of any of the compounds listed in claims 1, 2, or 12.

Applicants fail to describe a representative number of polynucleotide sequences from a number of plant species encoding a sulfotransferase capable of sulfonating 12- or 11-hydroxyjasmonic acid falling within the scope of the claimed genus of polynucleotides which are at least 50% identical to SEQ ID NO:1 or any nucleic acid that modifies flowering and modifies the levels of any of the compounds listed in claims 1, 2 or 12. Applicants only describe a single cDNA sequence of SEQ ID NO:1. Furthermore, Applicants fail to describe structural features common to members of the claimed genus of polynucleotides. Hence, Applicants fail to meet either prong of the two-prong test set forth by *Eli Lilly*. Furthermore, given the lack of description of the necessary elements essential for the protein encoded by SEQ ID NO:1, it

remains unclear what features identify an Arabidopsis AtST2a protein. Since the genus of AtST2a proteins has not been described by specific structural features, and since Applicants have not disclosed any other nucleic acid sequence that can be used to modulate flowering and modulate the levels of any of the compounds listed in claims 1, 2 or 12, the specification fails to provide an adequate written description to support the breath of the claims.

Scope of Enablement

10. Claims 1-2, 4-9, 11-18, 43-44 and 47 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of increasing the time to flowering in Arabidopsis plants comprising transforming said plants with the Arabidopsis AtST2a genomic sequence of SEQ ID NO:1, operably linked to a promoter in antisense orientation, wherein the levels of 12- or 11-hydroxyjasmonic acid are increased relative to non-transgenic plants, does not reasonably provide enablement for any method that modulates flowering in a plant comprising modifying the endogenous level of at least one of any of the compounds listed in claims 1, 2 or 12, or wherein said method comprises increasing the level of a hydroxylase or wherein the method comprises transforming said plant with any nucleic acid or any nucleic acid encoding any sulfotransferase operably linked to any promoter in antisense orientation or a method to produce a transgenic plant that flowers early compared to a non-transgenic plant comprising transforming a plant with a nucleotide sequence encodinga plant hydroxyjasmonic acid sulfotransferase operably linked to a promoter in antisense orientation or wherein said nucleotide sequence has at least 50% sequence identity to SEQ ID NO:1. The specification does not enable

any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands,* 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

The claims are drawn to a method for modulating flowering in a plant comprising modifying in said plant the endogenous level of at least one compound listed in claim 1, or wherein flowering is induced by increasing at least one of the compounds listed in claim 1, or wherein the increase in at least one compound is increased by lowering the endogenous level of a sulfotransferase sulfonating 12-hydroxyjasmonic acid and/or 11-hydroxyjasmonic acid, or wherein said lowering is the result of a genetic modification, or wherein the genetic modification includes inhibiting expression of AtST2a and functional homologues thereof, or wherein said genetic modification includes an antisense nucleic acid sequence, a genetically modified plant in which the level of any of the compounds listed in claim 12 is increased, or wherein said plant has an increased level of a hydroxylase and/or a reduced level of a sulfotransferase, or wherein said level of a sulfotransferase is lowered by expressing any nucleic acid sequence encoding a sulfotransferase, or portion thereof, in antisense orientation, or a method for producing a plant

capable of flowering early comprising introducing into a cell an exogenous nucleic acid molecule comprising a nucleotide sequence encoding a plant hydroxyjasmonic acid sulfotransferase in antisense orientation, or wherein said sulfotransferase is a 11- or a 12-hydroxyjasmonic acid sulfotransferase or wherein said nucleotide sequence exhibits 50% sequence identity with SEQ ID NO:1. The office interprets the word "similarity" in claim 44, line 5, to mean sequence identity, because "similarity" is generally reserved for amino acid comparisons and not nucleotide comparisons.

Applicants disclose a nucleic acid sequence encoding an Arabidopsis 12-hydroxyjasmonic acid sulfotransferase (AtST2a) of SEQ ID NO:1 (page 5, line 13-17 and page 6, lines 29-32). Applicants subcloned SEQ ID NO:1 into a vector comprising two CaMV 35S minimal promoters operably linked in antisense orientation (page 25, lines 13-14). The resulting construct was transformed into Arabidopsis which produced plants that had a lower level of endogenous hydroxyjasmonic acid sulfotransferase and 12-hydroxyjasmonate sulfate and flowered earlier compared to plant not transformed with said construct. Said plants also had a higher level of 12-hydroxyjasmonate compared to non-transgenic plants (page 29, lines 10-29).

The state-of-the-art teach transforming a plant with a nucleic acid molecule encoding a protein involved in jasmonic acid biochemistry does not lead to predictable results. Harms et al (1995, The Plant Cell 7:1645-1654) teach potato plants transformed with a nucleic acid sequence encoding an allene oxide synthase (AOS) which converts lipoxygenase-derived fatty acid hydroperoxide into the precursor for jasmonic acid formation. Harms et al disclose that overexpression of the AOS cDNA produced plants that had six to twelve fold higher levels of jasmonic acid compared to non-transformed plants but the transgenic plants did not exhibit

increased levels of other genes which are normally induced during increased levels of jasmonic acid caused by wounding (abstract). In short, jasmonic acid-responding genes were not induced when jasmonic acid levels were increased.

The state-of-the-art is such that one of skill in the art cannot predict which nucleic acids that are 95% sequence identical to SEQ ID NO:1 or 3 will encode a protein with the same activity as a protein encoded by SEQ ID NO:1 or 3. The prediction of protein structure from sequence data and, in turn, utilizing predicted structural determinations to ascertain functional aspects of the protein, is extremely complex, and the positions within the protein's sequence where amino acid substitutions can be made with a reasonable expectation of maintaining function are limited (Bowie et al, Science 247:1306-1310, 1990, see especially page 1306). Proteins may be sensitive to alterations in even a single amino acid in a sequence. For example, the replacement of a glycine residue located within the START domain of either the PHABULOSA or PHAVOLUTA protein receptor with either an alanine or aspartic acid residue, alters the sterol/lipid binding domain (McConnell et al, Nature 411 (6838):709-713, 2001, see especially page 710, left column, 2nd paragraph).

The state-of-the-art teach that antisense technology produces unpredictable results. Bryant (1989, Trends in Biotechnology 7(2):20-21) teaches using antisense to downregulate chalcone synthase did not always produce plants with the desired result. It was not clear why plants were produced with all levels of regulated chalcone synthase, from plants exhibiting suppression to plants exhibiting a wild-type phenotype (page 20, right column, 1st paragraph). Bryant suggests that "position effect" influences transgene expression (page 20, right column, 2nd paragraph). In addition, using sequences that are not 100% identical to the target sequence will

not produce expected results. Emery et al (2003, Current Biology 13:1768-1774) disclose experiments in which a target sequence of a micro-RNA was changed by two base-pairs. The altered base-pairs caused the complementary micro-RNA not to bind to the target sequence, which subsequently led to an increased expression of the target sequence's encoded protein (page 1769, right column, 2nd full paragraph).

Applicants have not disclosed how one makes or isolates any of the sequences that are encompassed by Applicants' broad claims. Applicants have not taught which regions of the respective polynucleotides can be used to amplify any of said polynucleotides or which regions can be used as a probe to isolate any of said polynucleotide sequences.

In the absence of guidance, undue trial and error experimentation would be required for one of ordinary skill in the art to screen through the multitude of non-exemplified sequences, either by using non-disclosed fragments of SEQ ID NO:1 as probes or by designing primers to undisclosed regions of SEQ ID NO:1 and isolating or amplifying fragments, subcloning the fragments in antisense orientation, producing expression vectors and transforming plants therewith, in order to identify those, if any, that when transcribed in the plant, reduce the endogenous level of 12- or 11-hydroxyjasmonic acid sulfotransferase and cause the plant to flower early when compared to a non-transgenic plant and exhibit 50% identity with SEQ ID NO:1 or cause the plant to flower early and modifies the level of any one of the compounds listed in claims 1, 2 or 12.

Therefore, given the breadth of the claims; the lack of guidance and examples; the unpredictability in the art; and the state-of-the-art as discussed above, undue experimentation would be required to practice the claimed invention, and therefore the invention is not enabled.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Krajncic et al (1995, J. Plant Physiol. 146:754-756).

The claims are drawn to a method for modulating flowering in a plant comprising modifying in said plant the endogenous level of at least one compound listed in claim 1, or wherein flowering is induced by increasing at least one of the compounds listed in claim 1.

Krajncic et al teach a method for increasing, inhibiting or blocking flowering in Spirodela polyrrhiza by growing said plant on media containing different concentrations of jasmonic acid, wherein 0.475-47.5 nM jasmonic acid enhanced or increased flowering, 237.5nM jasmonic acid inhibited flowering and 475nM blocked flowering (abstract). Given Applicants' own admitted statement of the prior art that jasmonic acid is converted to 12-hydroxyjasmonic acid by a single oxidation step catalyzed by jasmonic acid 12-hydroxylase (page 2, lines 2-4), it would be inherent that applications of jasmonic acid to plants would increase the levels of 12-hydroxyjasmonic acid, and as such, Krajncic et al anticipate the claimed invention.

10. Claims 4-9, 11-18, 43-44 and 47 are deemed free of the prior art, given the failure of the prior art to teach or reasonably suggest a method for producing plants that flower early comprising transforming a plant with SEQ ID NO:1 encoding a 12- or 11-hydroxyjasmonic acid sulfotransferase, wherein SEQ ID NO:1 is operably linked in antisense orientation to a promoter.

12. No claims are allowed.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on 571-272-0804. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

Stuart F. Baum Ph.D.
Patent Examiner
Art Unit 1638
September 30, 2004

AMY J. NELSON, PH.D
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

RESULT 7
US-10-019-931-2

; Sequence 2, Application US/10019931
; GENERAL INFORMATION:
; APPLICANT: Varin, Luc
; APPLICANT: Gidda, Satinda
; TITLE OF INVENTION: Methods, compositions and genetic sequences for
; TITLE OF INVENTION: modulating flowering in plants, and plants genetically
; TITLE OF INVENTION: modified to flower early and tardily.
; FILE REFERENCE: ROBIC 214187
; CURRENT APPLICATION NUMBER: US/10/019,931
; CURRENT FILING DATE: 2000-07-06
; PRIOR APPLICATION NUMBER: PCT WO 01/02589 A2
; PRIOR FILING DATE: 2000-07-06
; NUMBER OF SEQ ID NOS: 4
; SOFTWARE: PatentIn Ver. 2.1
; SEQ ID NO 2
; LENGTH: 1041
; TYPE: DNA
; ORGANISM: Arabidopsis thaliana
US-10-019-931-2

Query Match 78.3%; Score 843.6; DB 43; Length 1041;
Best Local Similarity 89.8%; Pred. No. 4.8e-242;
Matches 945; Conservative 0; Mismatches 89; Indels 18; Gaps 3;

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Qy         31 ATGGCGATCCCAAGTTTCTCCATGTGTCACAAGCTCGAGCTCCTTAAAGAAGGCAAAACT 90
               ||||||||||||||||||||||||||||||||||||||||| |||||||||||| ||||||||||
Db          1 ATGGCGATCCCAAGTTTCTCCATGTGTCACAAGCCCGAGCTCCTTAAGGAAGGCAAAAGC 60

Qy         91 CGCGACGTCCCGAAAGCCGAAGAAGATGAAGGGCTAAGCTGCGAGTTCCAAGAGATGTTG 150
                   ||| | |||||||| |||||||||||||| ||||||||||||||||||||||||||
Db         61 G------------AAGGCCAAGAAGAAGAAGGGCTAAGCTACGAGTTCCAAGAGATGTTG 108

Qy        151 GATTCTCTTCCTAAGGAGAGAGGATGGAGAACTCGTTACCTTTACCTATTCCAAGGGTTT 210
              || |||||||||||||||||||| |||||| |||||||||||| ||||||||||||||||
Db        109 GACTCTCTTCCTAAGGAGAGAGGACGGAGAAATCGTTACCTTTACTTATTCCAAGGGTTT 168

Qy        211 TGGTGCCAAGCCAAAGAGATTCAAGCCATCATGTCTTTCCAAAAACATTTCCAATCCCTC 270
              |||||||||| || |||||||||||| |||| ||||||||||||||| || |||||||
Db        169 CGGTGCCAAGCTAAGGAGATTCAAGCTATCACGTCTTTCCAAAAACATTTTCAGTCCCTT 228

Qy        271 GAAAACGACGTCGTTCTCGCCACCATACCTAAATCCGGTACAACCTGGCTAAAAGCTTTA 330
               | ||||||| || |||||||||||||||||||| || ||||||||| ||||||||||
Db        229 CCAGACGACGTTGTCCTCGCCACCATACCTAAATCTGGCACAACCTGGTTAAAAGCTTTA 288

Qy        331 ACTTTCACCATCCTTAACCGTCACCGGTTTGATCCGGTTGCC---TCGAGTACCAACCAC 387
              |||||||||||||| |||||| |||||||||||||||| ||   || ||| || |||||
Db        289 ACTTTCACCATCCTTACCCGTCATCGGTTTGATCCGGTTTCCTCATCAAGTTCCGACCAC 348

Qy        388 CCTCTTTTCACTTCCAACCCTCATGACCTTGTACCTTTCTTCGAGTACAAGCTTTACGCC 447
              |||||| |||| |||||||||||| ||||| ||||||||||||||||||||||||||||
Db        349 CCTCTTCTCACATCCAACCCTCACGACCTCGTACCTTTCTTCGAGTACAAGCTTTACGCC 408

Qy        448 AACGGAGATGTTCCCGATCTCTCGGGTCTAGCCAGTCCAAGAACGTTCGCAACCCACTTA 507
              |||||| |||||||||||||||||||||||||||||||||||| |||||||||||| ||
Db        409 AACGGAAATGTTCCCGATCTCTCGGGTCTAGCCAGTCCAAGAACATTCGCAACCCACGTA 468

Qy        508 CCGTTCGGTTCCCTAAAGGAAACGATCGAGAAACCCGGTGTGAAGGTCGTGTACTTGTGC 567
              ||||||||| |||| ||||| || |||||||| ||| |||||||||| |||||| |||||
Db        469 CCGTTCGGTGCCCTTAAGGATTCGGTCGAGAATCCCAGTGTGAAGGTTGTGTACCTGTGC 528

Qy        568 CGGAACCCGTTTGACACATTCATCTCTTCGTGGCATTACACCAACAACATCAAATCCGAG 627
              |||||||||||||||||||||||||||||   |||||||||| |||||||||| ||||||
Db        529 CGGAACCCGTTTGACACATTCATCTCCATGTGGCATTACATCAACAACATCACTTCCGAG 588

Qy        628 TCAGTGAGCCCAGTCTTGCTAGACCAAGCTTTTGATCTGTATTGCCGGGG---AGTGATC 684
              ||||||||| |||||||||||||| |||||||||||| |||||||||||    | |||||
Db        589 TCAGTGAGCGCAGTCTTGCTAGACGAAGCTTTTGATCTATATTGCCGGGGATTACTGATC 648

Qy        685 GGGTTTGGCCCGTTTTGGGAACACATGTTGGGATACTGGAGAGAGAGCTTGAAGAGACCA 744
              || |||||||||||||||||||||||||||||||||||||||||||||||||||||| |||
Db        649 GGATTTGGCCCGTTTTGGGAACACATGTTGGGATACTGGAGAGAGAGCTTGAAGAGGCCA 708

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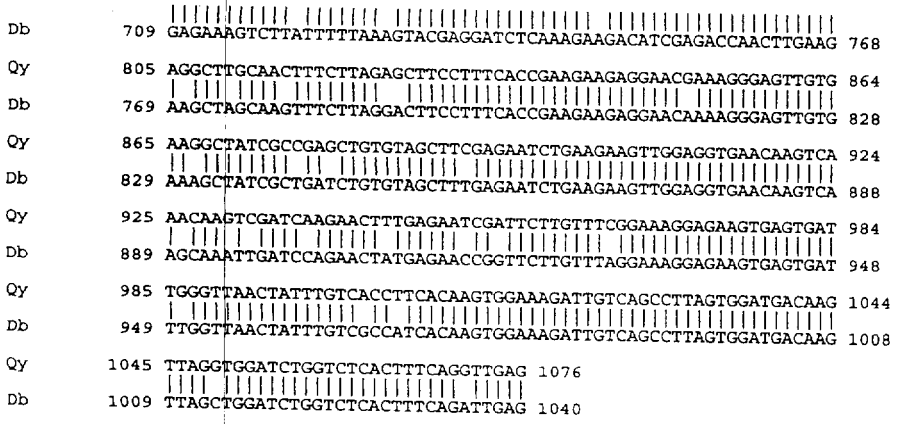
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